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U. S. NAVAL PROVING GROUND
DAHLGREN, VIRGINIA

REPORT NO 1091

SERVICE MOUNT IMPROVEMENT

4th Partial Report

TEST OF SURVIVAL WEAPONS

4th Partial
Report

Task
Assignment NPG-Re5-1-17-53

Copy No. 9

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NFG REPORT NO. 1093

Test of Survival Weapons

PART A

SYNOPSIS

1. This is a report of tests to determine the performance of the Colt Cobra .38 Special Lightweight Revolver in view of its possible adoption as a weapon for arming pilots and aircrewmembers.
2. The results of the tests indicate that the Colt Cobra is not a suitable replacement for the standard service revolver now in use.
3. In the event the weapon is adopted, the following changes are necessary:
 - a. The trigger guard be enlarged to accommodate a gloved finger.
 - b. The present cylinder be replaced with one having a greater margin of safety.

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NPG REPORT NO. 1091

Test of Survival Weapons

TABLE OF CONTENTS

	<u>Page</u>
SYNOPSIS	1
TABLE OF CONTENTS.	2
AUTHORITY.	3
REFERENCES	3
BACKGROUND	3
OBJECT OF TEST	3
PERIOD OF TEST	3
DESCRIPTION OF ITEMS UNDER TEST.	4
DESCRIPTION OF TEST EQUIPMENT.	4
PROCEDURE.	5
RESULTS.	7
CONCLUSIONS AND RECOMMENDATIONS.	13
APPENDIX A - NATIONAL SILHOUETTE TARGET WITH TAPED AREA FOR DETERMINING KILLS	FIGURE 1
COLT COBRA LIGHTWEIGHT AFTER 96 HOURS IN A 20% SALT FOG	FIGURE 2
SMITH AND WESSON "VICTORY" AFTER 96 HOURS IN A 20% SALT FOG.	FIGURE 3
COLT COBRA LIGHTWEIGHT ILLUSTRATING BULLET CREEP WITH LUBALOY BULLETS	FIGURE 4
APPENDIX B - DISTRIBUTION.	1 (Only)

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Test of Survival Weapons
-----PART BINTRODUCTION

1. AUTHORITY:

This test was authorized by reference (a) under Task Assignment NPG-Re5-1-17-53, reference (b).

2. REFERENCES:

- a. BUORD Conf ltr Re5e-CEA:hts S79-4(16) Ser 27046 of 15 Oct 1951
- b. BUORD Conf NP9 Re5e-HWA:hts Ser 44623 of 11 Sep 1952
- c. NAVPROV Conf ltr OMB:CLC:bas All/5009-17 Ser 22628 of 9 Sep 1952

3. BACKGROUND:

The Air Force has adopted a caliber .38 Special, Lightweight Revolver. The Bureau of Ordnance was requested by the Chief of Naval Operations to test and evaluate the weapon and report its findings.

4. OBJECT OF TEST:

The object of the test was the evaluation of the lightweight caliber .38 revolver as a possible replacement for the standard weight caliber .38 revolver now in use by pilots and aircrewmen.

5. PERIOD OF TEST:

- a. Date of Project Letter 15 Oct 1951
- b. Date Commenced Test 11 Feb 1952
- c. Test Completed 5 Dec 1952

Test of Survival Weapons
-----PART CDETAILS OF TEST

6. DESCRIPTION OF ITEMS UNDER TEST:

a. The Colt (Cobra) Lightweight Revolver Caliber .38 Special weighs 12.1 ounces, is 6 3/4" in length overall with a 2" barrel and has a cylinder chambered for six .38 caliber cartridges. The cylinder and frame are of aluminum alloy, while the barrel is of steel.

The weapon is of the double action type with hammer notch for single action. The hammer is the exposed non-shrouded type. Sights are non-adjustable.

b. The control weapon was a Colt Official Police Model Caliber .38 Special revolver weighing 32 ounces with a 4" barrel, a double action revolver with single action provision. The hammer is exposed and sights are fixed.

c. For purposes of accuracy comparison the standard service Smith and Wesson caliber .38 special revolver was fired. The weight of this weapon is 30 ounces with a 4" barrel. The weapon is double action with single action provision and the sights are fixed.

7. DESCRIPTION OF TEST EQUIPMENT:

a. Ammunition:

- (1) Western .38 Special Lubaloy 158 grain bullets.
- (2) Remington Kleanbore .38 Special 158 grain bullet with steel jacket.

b. Salt vapor chamber.

c. Cold Box at (-)70°F.

d. Cold Chamber at (-)70°F.

e. Dust Chamber.

f. 50 yard Standard American Pistol Targets.

Test of Survival Weapons

g. National Silhouette Targets with Standard American 25 yard Pistol Target superimposed over the center of the silhouette. Target measured 41" in height and 19 1/2" across the shoulders. (Appendix (A), Figure 1)

h. Fir boards and other small items of equipment.

8. PROCEDURE:

a. Military characteristics were determined and recorded.

b. Physical characteristics were determined and recorded.

c. Accuracy Test Fired:

(1) Results recorded over the standard Navv qualification course.

(2) Results recorded for twenty (20) shots timed fire at 25 yards on the National Silhouette Target.

(3) Results recorded for twenty (20) shots slow fire at 50 yards.

d. Penetration Tests (7/8" Fir Boards):

(1) Colt Lightweight:

(a) 5 yards - three (3) rounds

(b) 25 yards - three (3) rounds

(c) 50 yards - three (3) rounds

(2) Colt Official Police:

(a) 5 yards - three (3) rounds

(b) 25 yards - three (3) rounds

(c) 50 yards - three (3) rounds

(3) Smith and Wesson M & P ("Victory"):

(a) 5 yards - three (3) rounds

(b) 25 yards - three (3) rounds

(c) 50 yards - three (3) rounds

Test of Survival Weapons

e. Adverse Conditions Test:

(1) Rain Spray:

- (a) 200 rounds were fired with a heavy spray directed on all three (3) weapons.

(2) Dust Test:

- (a) The weapons were mounted in a dust box with dust agitated by a blower. After exposure to dust, all three (3) weapons were fired to check functioning.

(3) Ice Test:

- (a) The weapons and ammunition were placed in a cold chamber at -70°F for four (4) hours. Ten (10) rounds were fired with each weapon from the cold chamber.
- (b) The weapons and ammunition were conditioned in a cold box at -70°F for 24 hours, removed and fired enough rounds to warm up the weapon, then returned to the cold box for 24 hours. At the end of the second 24 hour period the weapons were removed and fired again.

(4) Salt Spray Test:

- (a) Two weapons (Cobra and S & W "Victory") were placed in a 20% salt fog cabinet at 100°F. When the weapons were placed in the cabinet, they were immersed in the salt solution and then dried off without disassembly. After 24 hours in the fog, the weapons were reimmersed, dried, and returned to the salt fog for a total of 96 hours. Weapons were checked for functioning every 24 hours and results recorded.

f. Endurance Test:

- (1) 700 rounds fired double action.
- (2) 300 rounds fired single action.

Test of Survival Weapons

9. RESULTS:

a. Military Characteristics:

(1) Colt (Cobra) Lightweight Revolver Caliber .38 Special:

- (a) Weight: 12.1 ounces
- (b) Length Overall: 6 3/4" (2" bbl.)
- (c) Sight Radius: 3 3/8"
- (d) Trigger Pull: 3 1/2 lbs. Single Action
- (e) Cylinder Capacity: 6 Caliber .38 Special Cartridges
- (f) Groove and Twist: 6 Groove - 1 turn in 16 inches

(2) Colt Official Police Revolver Caliber .38 Special (Control Weapon):

- (a) Weight: 32 ounces
- (b) Length Overall: 9 1/8"
- (c) Sight Radius: 5 1/4"
- (d) Trigger Pull: 6 lbs. Single Action
- (e) Cylinder Capacity: 6 Caliber .38 Special Cartridges
- (f) Groove and Twist: 6 Groove - 1 turn in 16 inches

(3) Smith & Wesson M & P (Victory Model) Caliber .38 Special:

(Data on this weapon included only where it might have some bearing on the comparative accuracy of the weapon.)

- (a) Weight: 30 ounces
- (b) Length Overall: 9 1/8"
- (c) Sight Radius: 5 1/8"

Test of Survival Weapons

- (d) Trigger Pull: 5 1/2 lbs. Single Action
- (e) Cylinder Capacity: 6 Caliber .38 Special Cartridges
- (f) Groove and Twist: 5 Groove - 1 turn in 18.75 inches

b. Physical Characteristics (Colt Cobra Lightweight only):

- (1) Time required to field strip and assemble (Swing out cylinder):

No time required

- (2) Time required to detail strip and assemble:

6 minutes (experienced man)

- (3) Number of steps required to detail strip (Not reassembled):

10 steps

- (4) Tools required to detail strip:

- (a) 1 small screw driver (3/16)
- (b) Small punch
- (c) Small hammer
- (d) Small long nose pliers

- (5) Number of Parts:

- (a) Coil springs: 4
- (b) Leaf springs: 1
- (c) Pins: 7
- (d) Screws: 5
- (e) Machined Parts: all metal parts
- (f) Total parts: 44

c. Target Accuracy Tests:

- (1) Standard Navy Qualification Course. (Maximum possible score - 400). Both shooters were Navy Expert Pistol Shooters.

<u>Shooter</u>	<u>S & W</u>	<u>Colt O.P.</u>	<u>Cobra</u>
A	371	373	320
B	341	343	307

Test of Survival Weapons

(2) Silhouette Course. This course was fired at 25 yards on a silhouette target (Appendix (A), Figure 1) which had a standard 25 yard target superimposed over the lower chest. Hits inside the area outlined with heavy tape were considered kills and those outside but still on the silhouette were considered wounds. Scores were for 20 rounds timed fire (fired in five (5) shot strings - 20 seconds for each five (5) shot string).

Group One

Silhouette Target, 25 yards, 20 shots timed fire

<u>Shooter</u>	<u>S & W</u>		<u>Colt O.P.</u>		<u>Cobra</u>	
	<u>K</u>	<u>W</u>	<u>K</u>	<u>W</u>	<u>K</u>	<u>W</u>
A (Mks)	10	9	12	6	9	10
B (Mks)	17	3	16	4	4	10
C (Unqual)	6	9	8	11	6	8
D (Unqual)	7	10	5	7	5	8

The totals for 80 shots for each gun is as follows:

<u>Gun</u>	<u>Kills</u>	<u>Wounds</u>	<u>Misses</u>
S & W (Victory)	40	31	9
Colt (Police Positive)	41	28	11
Colt Cobra	24	36	20

Group Two

Silhouette Target, 25 yards, 20 shots timed fire

<u>Shooter</u>	<u>Colt O.P.</u>		<u>Cobra</u>	
	<u>K</u>	<u>W</u>	<u>K</u>	<u>W</u>
A (Expert)	18	2	10	9
B (Expert)	18	2	12	7
C (Mks)	11	6	3	9
D (Unqual)	3	2	1	1

The totals for 80 shots for each gun is as follows:

<u>Gun</u>	<u>Kills</u>	<u>Wounds</u>	<u>Misses</u>
Colt Official Police	50	12	18
Colt Cobra	26	26	28

Test of Survival Weapons

(3) Scores for 50 yards Slow Fire (Maximum score 200):

<u>Shooter</u>	<u>Colt O.P.</u>	<u>Cobra</u>
A (Expert)	158	107
B (Expert)	149	83

d. Penetration Tests (7/8" Fir Boards Spaced 7/8" apart - all results are the average of three shots):

(1) Colt Lightweight (Cobra):

(a) 5 yards - 2.44"
(b) 25 yards - 2.50"
(c) 50 yards - 2.44"
Average - 2.46"

(2) Colt Official Police:

(a) 5 yards - 3.59"
(b) 25 yards - 3.84"
(c) 50 yards - 3.56"
Average - 3.66"

(3) Smith & Wesson M & P ("Victory"):

(a) 5 yards - 2.88"
(b) 25 yards - 2.97"
(c) 50 yards - 2.94"
Average - 2.93"

(4) The penetration with the Cobra was approximately 67% of that obtained with the Colt Police Positive. The poor penetration of the Smith and Wesson ("Victory") is attributed to barrel wear. Exact number of rounds fired with this weapon is unknown, but it has evidently seen much use.

e. Functioning Under Adverse Conditions:

(1) Rain Test:

(a) 200 rounds were fired with a heavy spray from a hose fitted with a nozzle directed on the weapons. There were no stoppages or malfunctions.

Test of Survival Weapons

(2) Dust Test:

- (a) The weapons were mounted in a dust box and the dust agitated with a blower for 5 minutes. The weapons were removed, dust blown out of the barrel and cylinder by exhaling through them and then fired. There were no stoppages or malfunctions.

(3) Ice Test:

- (a) The weapons and ammunition were placed in a cold room at -70°F for four (4) hours and then ten (10) rounds fired from the cold room through a port. There were no misfires or malfunctions.
- (b) The weapons and ammunition were placed in a cold box at -70°F for 24 hours, then removed and enough rounds were fired to warm up the weapon at ambient temperature (+72°F). During the firing, a heavy coat of frost formed over most of the weapon. Upon completion of firing, the weapons and ammunition were returned to the cold box at -70°F for 24 hours. On completion of the second 24 hour period, the weapons were removed and fired again. There were no misfires or malfunctions.
- (c) During the above tests, it was necessary for the firing officer to change from the pilot's medium weight winter gloves to summer weight gloves due to the fact that the trigger guard on the Cobra was so small winter gloves would not allow the trigger to return to the full forward position and pick up the cylinder to rotate it to the next round.

(4) Salt Spray Test:

- (a) Two (2) weapons (Cobra and S & W "Victory") were placed in a 20% salt fog cabinet at 100°F for a total of 96 hours. At the beginning of the period, the weapons were immersed in the salt solution and then dried as best possible without disassembly. After 24 hours, the weapons were re-immersed and dried. The immersion was intended to simulate conditions likely to be encountered in a ditching or bail out over the ocean. The results are as follows:

Test of Survival Weapons

1. Colt Cobra:

- a. After 24 hours, the cylinder latch was inoperative so that the six (6) rounds in the cylinder could have been fired but new rounds could not have been loaded. The trigger would not function unless it was manually returned to the forward position.
- b. After 48 hours, the weapon would not function at all. Cylinder, trigger, and hammer were frozen.
- c. Appendix (A), Figure 2 illustrates the degree of corrosion reached after 96 hours.

2. Smith and Wesson "Victory":

- a. Weapon functioned satisfactorily after 96 hours in the salt fog and two (2) immersions in the salt solution.
- b. 72 hours after removal from the salt fog cabinet, the cylinder was hard to open and hammer fall was light. The trigger had to be returned to the full forward position manually. 6 rounds were fired single action and 6 rounds double action. In single action firing, the primer of the first round had to be hit three (3) times before firing, round two had to be hit two (2) times, and the remaining four (4) rounds fired satisfactorily. The following six (6) rounds double action fired satisfactorily.
- c. Appendix (A), Figure 3 illustrates the degree of corrosion after 96 hours in the salt fog.

f. Endurance Test:

(1) Colt Cobra .38 Special Lightweight:

- (a) 300 rounds single action with no malfunctions.

Test of Survival Weapons

- (b) 700 rounds double action. On rounds 73 and 103 the cylinder failed to line up with the barrel shaving off a sliver of the projectile and jamming the cylinder.
 - (c) Previous tests with an identical gun using lead bullets were discontinued when it was found that the severe recoil of the Cobra caused the projectile of the fifth or sixth round to creep out of the case and jam the cylinder with the nose of the projectile bearing against the frame. (Appendix (A), Figure 4). This difficulty was not encountered while using steel jacketed ammunition.
 - (d) Upon completion of the above tests, the weapon was fired for accuracy and pilots reaction to the weapon. At approximately 1800 rounds, one (1) chamber in the cylinder ruptured. The metallurgists findings were reported in reference (c).
- (2) Colt Police Positive .38 Special:
- (a) 300 rounds single action with no malfunctions.
 - (b) 700 rounds double action with no malfunctions.

PART DCONCLUSIONS AND RECOMMENDATIONS

10. a. The following factors were the main points on which the performance of the Colt Cobra was judged:

(1) One (1) chamber in the cylinder ruptured after approximately 1800 rounds - or 300 rounds per chamber.

(2) Due to the great difference of the metals in the weapon on the electromotive scale the deterioration of the aluminum in the salt fog caused the weapon to completely freeze after only 48 hours exposure.

(3) The ability of the shooter to kill a man fell off to approximately 54% of that with the standard arm except at very close ranges (15 yards and under).

Test of Survival Weapons

(4) Penetration is approximately 67% of that obtained with a 4 inch barrel.

(5) Recoil is extreme which will call for more intensive training. Recoil is such that it is necessary to use an extremely tight grip in rapid fire, otherwise the weapon rocks down into the hand so far that it is necessary to release the weapon and take a new grip on it to continue firing.

(6) The weapon could not be fired with even medium weight gloves on due to the small size of the trigger guard.

b. Based on the above factors it is considered that the Colt Cobra Lightweight .38 Special Revolver is not a suitable replacement for the standard weight .38 Special now in service use unless convenience and ease of carrying is a vital factor, and then only if the following changes are made to the weapon:

(1) A cylinder giving a greater margin of safety is substituted for the present cylinder (reference (c)).

(2) The trigger guard is enlarged to accommodate a gloved finger.

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Test of Survival Weapons

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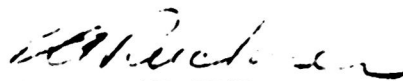
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U. S. NAVAL PROVING GROUND
DAHLGREN, VIRGINIA

Fourth Partial Report
on
Service Mount Improvement

Fourth Partial Report
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Test of Survival Weapons



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National Silhouette Target

THE NATIONAL TARGET CO.
1000 17th St. N.W.
Washington, D.C.

51535

Silhouette target for timed fire accuracy test. Hits inside taped area were considered kills. Hits outside taped area but on the silhouette were considered wounds.

TP9-51834 Lightweight. Illustrating corrosion after 96 hours in salt fog. Weapon
Colt "Cobra" failed to function after 48 hours.



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Figure 2

17-51164 Smith & Wesson "Victor" Model 38 .38 S&W revolver after 66 hours
in a 20 salt fog. Weapon was serviceable upon completion of test.

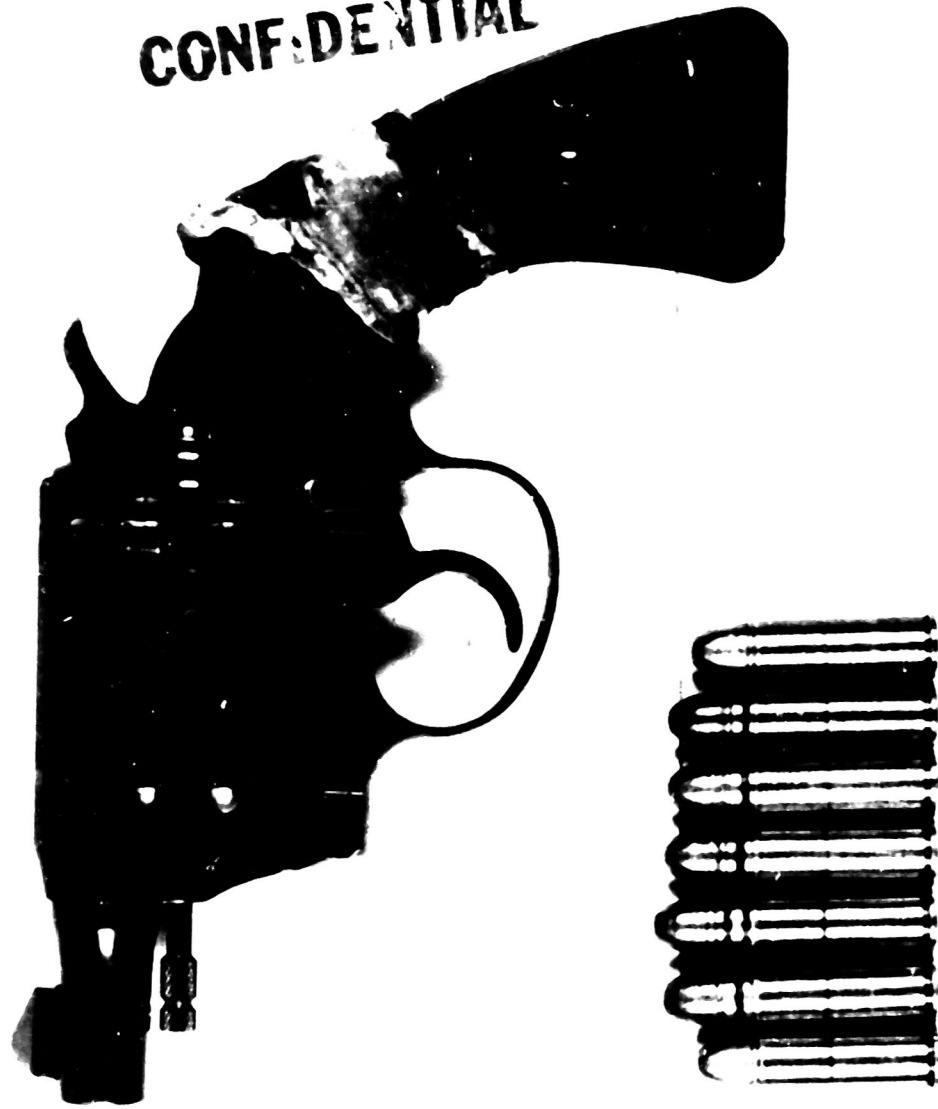


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Figure 3

NP9-51836

Colt "Cobra" Lightweight. Illustrating bullet creep due to recoil when using lubaloy bullets. Note bullets projecting from cylinder of revolver.



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